IFW

HT-03-009

May 21, 2004

To: Commissioner for Patents
P.O.Box 1450
Alexandria, VA 22313-1450

Fr: George O. Saile, Reg. No. 19,572
28 Davis Avenue
Poughkeepsie, N.Y. 12603

Subject: Serial No. 10/796,387 03/09/04

Cheng T. Horng et al.

A NOVEL PROCESS AND STRUCTURE TO FABRICATE CPP SPIN VALVE HEADS FOR ULTRA-HIGH RECORDING DENSITY

INFORMATION DISCLOSURE STATEMENT

Enclosed is Form PTO-1449, Information Disclosure Citation In An Application.

The following Patents and/or Publications are submitted to comply with the duty of disclosure under CFR 1.97-1.99 and 37 CFR 1.56.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on May 24, 2004.

Stephen B. Ackerman, Reg.# 37761

Signature/Date 5/24/04

Takagishi et al., "The Applicability of CPP-GMR Heads for Magnetic Recording," IEEE Transactions on Magnetics, Vol. 38, No. 5, Sept. 2002, pp. 2277-2282, describes a tunnel magneto-resistive (TMR) head in a CPP operation mode which is a candidate for realizing high sensitivity.

U.S. Patent 6,581,272 to Li et al., "Method for Forming a Bottom Spin Valve Magnetoresistive Sensor Element," discusses the use of a novel nano-oxide layer (NOL) in the pinned layer of a bottoom spin valve sensor structure to improve its GMR ratio.

U.S. Patent 6,165,607 to Yamanobe et al., "Sputtering Target and Antiferromagnetic Film and Magneto-Resistance Effect Element Formed by Using the Same," discloses a sputtering target containing Mn, one other metal, and less than 1% oxygen employed to form an AFM layer in a magnetic sensor in a read head.

A small amount of oxygen doped into an AFM layer has been used to improve the exchange bias field as reported by H. Fuke et al., in "Influence of Crystal Structure and Oxygen Content on Exchange-Coupling Properties of IrMn/CoFe Spin-Valve Films," Applied Physics Letters, Vol. 75, No. 23, Dec. 6, 1999, pp. 3680-3682.

U.S. Patent 6,331,773 to Engel, "Pinned Synthetic Anti-Ferromagnet with Oxidation Protection Layer," discloses an AFM layer containing oxygen.

U.S. Patent Application Publication US 2004/0004261 A1 to Takahashi et al., "Magneto-Resistive Devices," discloses a magneto-resistive device which has a high reproducing output and is suitable for use as CPP-GMR.

U.S. Patent Application Publication US 2002/0161079 A1 to Staller et al., "Use of Phosphate Group-Containing Polymer Dispersions as Adhesives," discusses an aqueous polymer dispersion and an adhesive for self-adherent peelable films, tapes, and labels.

U.S. Patent 6,621,666 to Miyauchi et al., "Magneto-resistive-Effect Element Having Electrode Layers Oppositely Disposed on Main Surfaces of a Magnetoresistive-Effect Thin Film Having Hard Magnetic Bias Layers with a Particular Resistivity," teaches using Ar-10% O2 at 0.5 Pa as the sputtering gas to form CoF2O3 film at opposite ends of the spin valve film.

U.S. Patent 6,574,079 to Sun et al., "Magnetic Tunnel Junction Device and Method Including a Tunneling Barrier Layer Formed by Oxidations of Metallic Alloys," describes depositing a NiCr layer at optimized Ar pressure.

U.S. Patent Application Publication US 2003/0184918 A1 to Lin et al., "Dual Spin Valve Sensor with a Longitudinal Bias Stack," discloses a dual spin valve (SV) sensor with a longitudinal bias stack sandwiched between a first SV stack and a second SV stack.

U.S. Patent Application Publication US 2002/0146580 A1 to Wang et al., "Magnetic Devices Using Nanocompoiste Materials," discloses a trace of oxygen added to Ar at 30 m Torr in depositing a CoF-HfO layer.

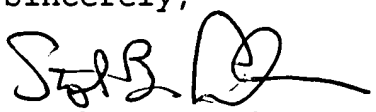
Tanaka et al., "Spin-Valve Heads in the Current-Perpendicular-to-Plane Mode for Ultrahigh-Density Recording," IEEE Transactions on Magnetics, Vol 38, No. 1, Jan. 2002, pp. 84-88, investigates the magnetoresistance properties of spin valves in the current-perpendicular-to-plane (CPP) mode.

Ohashi et al., "Low-Resistance Tunnel Magnetoresistive Head," IEEE Transactions on Magnetics, Vol. 36, No. 5, Sept. 2000, pp. 2549-2553, discusses differences in noise voltages between TMR head and GMR head when their resistance was low.

Egelhoff et al., "Oxygen as a Surfactant in the Growth of Giant Magnetoresistance Spin Valves," Journal of Applied Physics, Vol. 82, No. 12, Dec. 1997, pp. 6142-6151, discusses a novel method for increasing the giant magnetoresistance (GMR) of Co/Cu spin valves with the use of oxygen.

U.S. Patent Application Publication US 2003/0011940 A1 to Tateyama et al., "Magnetic Head and Magnetic Reproducing Apparatus," discusses a magnetic head including a magnetic yoke having a projected portion toward a recording medium, and a magnetic reproducing apparatus incorporating the magnetic head.

Sincerely,



Stephen B. Ackerman,
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Form PTO-1449

INFORMATION DISCLOSURE CITATION IN AN APPLICATION

(Use several sheets if necessary)

Docket Number (Optional)	Application Number
HT-03-009	10/796,387
Applicant: Cheng T. Horng et al.	
Filing Date: 03/09/04	Group Art Unit

U. S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
	6581272	6/24/03	Li et al.	29	603.14	1/4/02
	6165607	12/26/00	Yamanobe et al.	428	332	11/20/97
	6331773	12/18/01	Engel	324	252	4/16/99
	6621666	9/16/03	Miyauchi et al.	360	324.12	2/28/01
	6574079	6/3/03	Sun et al.	360	324.2	7/13/01

FOREIGN PATENT DOCUMENTS

	Document Number	Date	Country	Class	Subclass	Translation YES	Translation NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	Takagishi et al., "The Applicability of CPP-GMR Heads for Magnetic Recording", IEEE Trans. on Magnetics, Vol. 38, No. 5, Sept. 2002, pp. 2277-2282.
✓	H. Fuke et al., "Influence of Crystal Structure and Oxygen Content on Exchange-Coupling Properties of IrMn/CoFe Spin-Valve Films", Appl. Phys. Let., Vol. 75, No. 23, 12/6/99, pp. 3680-3682.

Examiner	Date Considered

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- Tanaka et al, "Spin-Valve Heads in the Current-Perpendicular to Plane Mode for Ultrahigh Density Recording", IEEE Trans. on Magnetics, Vol. 38, No. 1, Jan. 2002, pp. 84-88.
- Ohashi et al, "Low-Resistance Tunnel Magnetoresistive Head", IEEE Trans. on Magnetics, Vol. 36, No. 5, Sept. 2000, pp. 2549-2553.

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- Egelhoff et al, "Oxygen as a Surfactant in the Growth of Giant Magnetoresistance Spin Valves", Jrnl of Appl. Phys., Vol. 82, No. 12, Dec. 1997, pp. 6142-6151.
- US Patent App. Pub. US 2004/0004261 A1 to Takahashi et al., Pub. Date 1/8/04, Filed 12/31/02, US Cl. 257/414.

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- US Patent App. Pub. US 2002/0161079 A1 to Staller et al., Pub. Date 10/31/02, Filed 1/7/02, US Cl. 524/127.
- US. Patent App. Pub. US 2003/0184918 A1 to Lin et al., Pub. Date Oct. 2, 2003, Filed 4/2/02, US Cl. 360/314.

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–	U.S. Patent App. Pub., US 2002/0146580 A1 to Wang et al., Pub. Date 10/10/02, Filed 1/7/02, US Cl. 428/469.
–	U.S. Patent App. Pub., US 2003/0011940 A1 to Tategama et al., Pub. Date 1/16/03, Filed 6/24/02, US Cl. 360/321.

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